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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,902	09/22/2006	Akira Takeuchi	NAGA.0006	5764

7066 7590 12/04/2009

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EXAMINER	
SYKES, ALTREV C	
ART UNIT	PAPER NUMBER
1794	
MAIL DATE	DELIVERY MODE
12/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,902	TAKEUCHI ET AL.	
	Examiner	Art Unit	
	ALTREV C. SYKES	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 September 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-8,10-15 and 17-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-8, 10-15, 17-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see pg. 8, filed September 11, 2009, with respect to the rejection(s) of claim(s) 1-23 have been fully considered and are persuasive. Examiner notes that cited prior art does not explicitly address the limitations as set forth in the Article 34 Amendments. Further, Olry discloses a yarn in which the carbon fibers remain parallel to each other and not twisted. Therefore, all rejections are withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a different interpretation of the previously cited prior art and newly found prior art.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1, 4, 7, 10, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asano et al. (JP 2005-256248) in view of Chiu et al. (US 6,800,364).

This rejection is over JP 2005-256248 because the reference qualifies as prior art under 102(e). However, for convenience, the English language translation (US 7,520,121) will be cited below. US 7,520,121 is the patent granted on the national stage entry of WO 2005/087995 which claims priority to JP 2005-256248.

Regarding claims 1 and 7, Asano et al. discloses a fabric having a high stretching property is obtain able by extracting the water-soluble yarn from the composite twisted yarn with the hydrophilic solvent and removed from the textile obtained from the composite twisted yarn.(See Col 15, lines 54-58) Asano et al. discloses the composite twisted yarn may further comprise an elastic yarn in addition to the spun yarn and the water-soluble yarn, i.e., three species of yarns. (See Col 7, lines 9-14) Asano et al. discloses the spun yarn for the composite twisted yarn is not limited to a specific one. The spun yarn is made of a fiber which is insoluble in water (hot water), and may be any one of a synthetic fiber, a semisynthetic fiber, a regenerated fiber, or a natural fiber. (See Col 7, lines 15-20) Further, an inorganic fiber such as a glass fiber, a carbon fiber or a metal fiber may be used. (See Col 7, lines 47-49) As set forth by applicant in the remarks, a spun yarn is inherently twisted. (See pg. 9) Asano et al. further discloses the water-soluble yarn is not particularly limited to a specific one. In the textile obtained from a composite twisted yarn containing such a water-soluble yarn, the water-soluble

yarn can be easily removed by dissolving the water-soluble yarn in a hydrophilic solvent such as water. (See Col 8, lines 41-52) Asano et al. discloses the fiber constituting the water-soluble yarn is not particularly limited to a specific one as long as the fiber fulfils the above-mentioned water solubility requirement, and may include, for example, a fiber comprising (formed from) a water-soluble resin. The water-soluble resin may include, for example, a cellulose-series resin, or a polyvinyl-series resin (e.g., a polyvinylpyrrolidone, a polyvinyl ether, a polyvinyl alcohol, and a polyvinyl acetal). These water-soluble resins may be used singly or in combination. (See Col 9, lines 4-22) The water-soluble yarn may be either a spun yarn or a filament yarn, as long as the yarn is soluble in water. (See Col 9, lines 43-44) The water-soluble yarn having a yarn fineness of the above range realizes high productivity, and can be easily twisted with other yarn such as a spun yarn. (See Col 9, lines 54-57) As such, examiner notes that Asano et al. discloses that the water-soluble yarn may be a twisted yarn. Asano et al. discloses the yarn strength of the composite twisted yarn can be improved, and generation of fluff (or fuzz) in the spinning can be also decreased. Further, the water-soluble yarn can be easily removed by having the water-soluble yarn dissolved in the hydrophilic solvent, and the stretching property can be imparted to the textile after dissolving and removing the water-soluble yarn from the textile. (See Col 9, lines 57-63) Asano et al. discloses the composite twisted yarn having the proportion of these yarns in the above range excels in the ability to be weaved or knitted, yarn strength, and twisting stability. (See Col 11, lines 19-22) Asano et al. discloses a contractile force for filling the void caused by removal of the water-soluble yarn effectively acts on the textile, and thereby a stretching property of the textile can be

improved. In addition, the textile (fabric), after dissolving the water-soluble yarn from the textile made of the composite twisted yarn, has an improved feel, touch, and air permeability and is lightweight. (See Col 11, lines 24-30) Asano et al. discloses in view of the limitation of the number of creels of the twisting machine and quality control of the composite twisted yarn, the number of spun yarns is 1 to 3 (preferably 1 to 2, and more preferably 1), and the number of water-soluble yarns is 1 to 3 (preferably 1 to 2, and more preferably 1). (See Col 11, lines 39-44) Asano et al. discloses in such a composite twisted yarn, the twist direction of the composite twisted yarn (the twist direction upon twisting the spun yarn and the water-soluble yarn) (herein after, the twist of the composite twisted yarn is sometimes referred to as "second twist") is reverse to the twist direction of the spun yarn constituting the composite twisted yarn. (See Col 11, lines 46-51)

It would have been well within the ordinary skill of one in the art to utilize a twisted yarn comprising a first and second water-soluble polymer fiber since Asano et al. suggests the use of between 1 and 3 water-soluble polymer fibers to be twisted with between 1 and 3 spun fibers. (See Col 11, lines 39-44) Additionally, a prima facie case of obviousness exists for one of ordinary skill in the art to reverse the directions of each water-soluble polymer fiber around the spun carbon fiber as clearly suggested by Asano et al. (See Col 11, lines 46-51) Asano et al. does not disclose specifically disclose an isotropic pitch-based carbon fiber spun yarn.

Chiu et al. discloses insulation materials suited to high temperature applications, such as the insulation of furnaces, are formed from a mixture of pitch carbon fibers, such as isotropic pitch carbon fibers. (See Abstract) Chiu et al. discloses isotropic pitch carbon fibers have been found to exhibit a desirable combination of low thermal conductivity and high flexural strength, as compared to other carbon fibers, such as polyacrylonitrile (PAN)-based carbon fibers and mesophase pitch carbon fibers. (See Col 3, lines 6-10) The pitch is heated to a liquid state and spun to form semi-viscous solid "fibers." The fibers are stabilized by a process known as infusibilization. (See Col 3, lines 25-27) Chiu et al. discloses the yarns may be woven in desired shapes. (See Col 3, lines 65-66)

As both Asano et al. and Chiu et al. are both directed to fabrics made of carbon fibers exhibiting increased flexural strength, the art is analogous. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention motivated by expected success to substitute the carbon fibers as disclosed by Asano et al. with the isotropic pitch carbon fibers as taught by Chiu et al. in order to further tailor the flexural strength of the final fabric for intended use.

Regarding claims 4, 10, and 17 Asano et al. discloses the fiber comprising a water-soluble polyvinyl alcohol-series resin is commercially available as, for example, a water-soluble vinylon. (See Col 9, lines 38-42)

Regarding claim 14 examiner maintains the position as set forth above. The composite yarn as claimed by applicant is taught by modified Asano et al. until the step of removing the water-soluble polymer fiber is performed.

5. Claims 2, 5,6, 8, 11,12,15,18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asano et al. (JP 2005-256248) in view of Chiu et al. (US 6,800,364) as applied to claim 1 above, and further in view of Kitamura et al. (US 5,030,435) and Hattori et al. (US 4,552,329) and Tai et al. (US 5,994,261).

Regarding claims 2, 8, and 15 modified Asano et al. discloses all of the claim limitations as set forth above, but the reference does not specifically discloses that the composite yarn further comprises a sizing agent layer which is also dissolved and removed with the water-soluble polymer fiber.

Kitamura et al. discloses pitch carbon fiber chopped strand accumulation has a high bulk density and relieve exothermic excursion naturally, and therefore neither combustion nor sticking takes place even in an oxidative atmosphere. (See Abstract) Kitamura et al. discloses an appropriate sizing agent, for example, a low-boiling solvent such as water and methanol or a sizing agent containing a solid lubricant such as molybdenum disulfide, tungsten disulfide, talc or graphite, is coated to pitch fiber just after the melt spinning process, bundling the fibers with a bundling roller, and then immediately cutting the bundle with a cutting apparatus into a length of 1 to 50 mm, preferably 1 to 25 mm, to

obtain a chopped strand. (See Col 2, lines 46-55) The chopped strand of high density accumulation thus obtained is subsequently infusibilized and carbonized. (See Col 2, lines 64-66) Kitamura et al. discloses that the pitch fiber bundle may be isotropic. (See Col 3, lines 9-10)

Hattori et al. discloses carbon fibers made from polyacrylonitrile and pitches comprising a sizing agent. (See Col 4, lines 20-21) Hattori et al. further discloses one such method of separating bundles of carbon fibers into single fibers is a method in which sizing agent applied onto the surfaces of a single fiber for the purpose of facilitating handling of the fibers, is removed, followed by dispersing them in water with supersonic agitation. (See Col 5, lines 1-5) Hattori et al. discloses an alternative method of separating bundles of carbon fibers into single fibers is a method of using the carbon fibers treated with a water-soluble sizing agent. (See Col 5, lines 35-37)

As modified Asano et al., Kitamura et al., and Hattori et al. are all directed to pitch carbon fibers, the art is analogous. Therefore it would have been obvious to one of ordinary skill in the art the time of the invention motivated by expected success to utilize the sizing agent as taught by Kitamura et al. and specifically, the water-soluble sizing agent of Hattori et al. in the composite fiber as disclosed by modified Asano for the added benefit of facilitating handling of the fibers. (See Hattori et al. Col 5, lines 1-5)

Regarding claims 5, 6, 11, 12, 18, 19, 20, 21, 23 as modified Asano et al. has been shown to teach an isotropic pitch-based carbon fiber spun yarn, it is the position of examiner that outside a showing to the contrary, the spun yarn of the prior art would exhibit substantially the same properties as that claimed by prior art. Applicant discloses that the second object is achieved by removing fine carbon fibers and aggregates thereof from the isotropic pitch-based carbon fiber spun yarn obtained by spinning an isotropic pitch-based carbon fiber sliver by a specific method and thereby setting the size and the number of the fine carbon fiber aggregates contained in the spun yarn equal to or below predetermined values. (See [0012]) Therefore, examiner notes that the specific spinning method utilized by applicant in order to obtain an isotropic pitch-based carbon fiber spun yarn is not recited in the claims and the instant specification is not explicit to such a method. However, examiner notes the specific method of producing isotropic pitch-based carbon fiber spun yarn as taught by Chiu et al. and Tai et al. (US 5,994,261). Tai et al. discloses the production system for pitch-type activated carbon fiber comprises a spinning unit A for melt-spinning a pitch to form a fiber aggregate, an infusiblizing unit B for infusiblizing the fiber aggregate with an infusiblizing gas and an activating unit C for activating the so-infusiblized fiber aggregate with an activating gas. (See Col 3, lines 50-55) Tai et al. further discloses the pitch mentioned above includes, for example, optically isotropic pitch, coal-based pitch, petroleum-based pitch and so on. (See Col 3, lines 66-67) Kitamura et al. discloses that the fibers may be cut to a length of 1 to 50mm, preferably 1 to 25mm. (See Col 2, lines 53-55) Kitamura et al. also discloses it is difficult to cut the bundle into a length shorter than 1 mm, and such a fiber length is too short to

embody the desired reinforcing effect. When the length of the chopped strand is longer than 50 mm, the chopped strand is the same to a continuous fiber so that an increase in fiber length gives no increase in reinforcing effect. When the length of the chopped strand is more than 50 mm, the high density accumulation state cannot be attained, and infusibilization is thereby hindered. (See Col 2, lines 56-64) It would have been obvious to one of ordinary skill in the art at the time of invention to have selected the overlapping portion of the ranges disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness. *In re Malagari,* 182 USPQ 549. Further, modified Asano et al. fails to teach the isotropic spun yarn contains fine carbon fiber aggregates having a maximum diameter equal to or below 3.0 times an average diameter of foundation yarn of the spun or an abundance ratio equal to or below 3 pieces per 10m . It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the diameter and abundance ratio since it has been held that, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). The burden is upon the Applicant to demonstrate that the claimed diameter and abundance ratio are critical and has unexpected results. In the present invention, one would have been motivated to optimize the diameter and abundance ratio motivated by the desire to control the properties of the final fabric such as feel, touch, and air permeability. (See Asano Col 11, lines 24-30)

Regarding claims 13 and 22, Asano et al. discloses the water-soluble yarn can be easily removed by dissolving (dissolving and washing) the water-soluble yarn in a hydrophilic solvent such as water. (See Col 8, lines 41-52) As such, examiner notes that it is in this step that the fine carbon fibers and aggregates thereof are removed from the isotropic pitch-based carbon fiber spun yarn.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALTREV C. SYKES whose telephone number is (571)270-3162. The examiner can normally be reached on Monday-Thursday, 8AM-5PM EST, alt Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A Chriss/
Primary Examiner, Art Unit 1794

/ACS/
Examiner
11/30/09